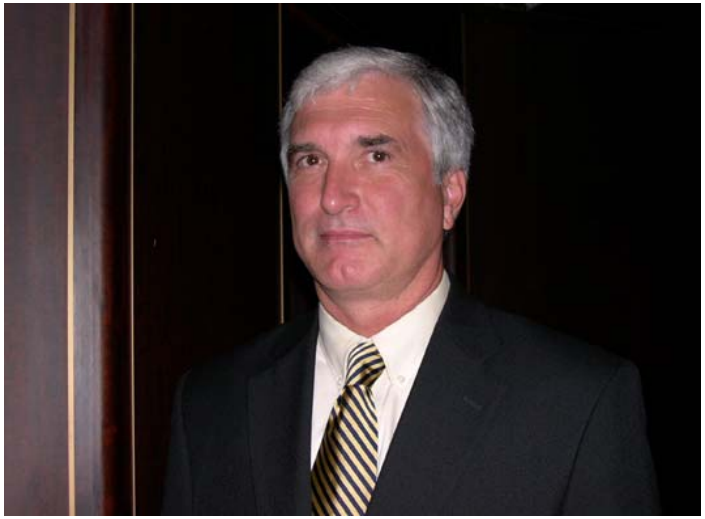
"Monitoring and Reporting Contract Performance Information" using Earned Value Management.



Robert Knauer, CPCM

Washington, DC

"Monitoring and Reporting Contract Performance Information" using Earned Value Management

OUTLINE

- Background
- Purpose
- Benefits
- Guidance
- Requirements
- Thresholds
- Decision Process
- Reporting
- Formats
- Validation/Compliance
- Hand outs

DAU EVM COMMUNITY OF PRACTICE

EVM Websites:

- ***Many others exists***
- OSD EVM
- Defense Contract Management Agency
- ASSIST
- DOD Forms Program
- National Defense Industrial Association
- Many Commercial EVM sites for training such as *Edwards Industries, LLC.*

EVM Purpose

"The Goal is to ensure performance management and program management processes are *fully integrated, effective, consistent, and reflective* of industry best practice, and that the Government gets what it pays for on schedule, on target, and with quality delivery at the right cost."

EVMS IN CIVILIAN AGENCIES

So you've heard you have to use EVMS…it is galloping into the federal civilian arena, promising to change the way you do business on Major Acquisition projects.

Change is occurring because OMB has now mandated that agencies comply with the EVMS standard in order to receive funding for the *development, modernization, or enhancement* of Major IT investments. (**Major Capital Investment**)

Currently there is no FAR coverage for EVMS but (a FAR case is pending) and it should be finalized by January or February--according to OMB.

•**Some agencies** are developing their own guidance for now, but don't be too fast to gallop down the wrong road.

Defense rewarded contractors despite poor performance By Kimberly Palmer @ GOVEXEC

The Government Accountability Office reported that the Defense Department paid contractors about $8 billion in award fees **despite the fact that their performance often did not warrant such rewards.** Award fees, which are supposed to compensate contractors for outstanding performance, are used frequently by Defense and civilian agencies. GAO report #GAO-06-66 found that Defense gave awards to contractors for mediocre and even poor performance. A contract for a Comanche reconnaissance attack helicopter was delayed for 33 months and cost $3.7 billion more than originally planned, yet the contractor was **paid $202.5 million in award fees**, GAO said. In another example, a space-based infrared system increased in cost by $3.7 billion, or 99.5 percent of expected costs, and was delayed by more than 12 months. The contractor received an award fee of $160.4 million. "The power of monetary incentives to motivate excellent contractor performance and improve acquisition outcomes is diluted by the way agencies structures and implements incentives."

SURVEY

- In a recent DOD Survey of over 800 DOD programs showed that

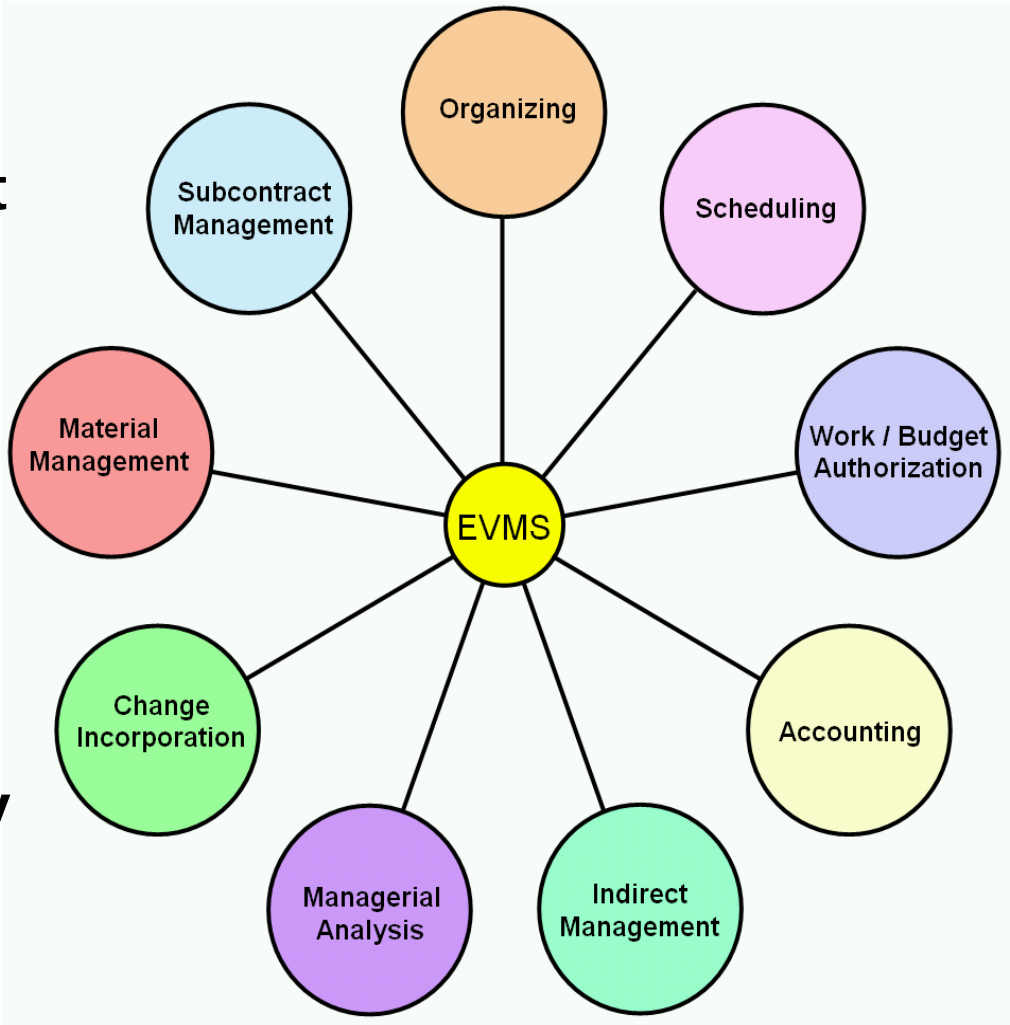
NO program has ever improved performance better than the performance than--at the 15% completion point!

No one pays enough attention in the early stages!

It is necessary to put in place systems that will keep everyone Honest. The proof is in the pudding.

So- Just What is Earned Value Management?

- **A widely accepted industry practice for project management in government and commercial work**
- **Use of an integrated management system (IMS) that coordinates *work scope, schedule, and cost goals* and objectively measures progress toward these goals**
- **(ANSI/EIA-748) Governed by industry standard**
- **32 system guidelines within ANSI/EIA-748 and addresses 9 Management processes**



Why Many Projects Fail

GOOD MANAGEMENT doesn't simply happen through osmosis. It takes ***qualified managers*--**on both the government and contractor sides to appropriately apply ***EVMS….and that means COMMUNICATION!***.

GOOD PLANNING. Carefully planned work scope, WBS, realistic milestones, realistic metrics, and a realistic cost baseline. Accurate data about schedule, work performed, and costs on at least a monthly basis with constant communications and trained EVMS personnel.

THE BOTTOM LINE is proper use of EVMS results through routine monitoring of results and taking of corrective action *keeps you on track with cost and schedule*.

EVM is a process for:

- **PLANNING** all work through completion
- **BREAKING DOWN program work scope** into finite pieces that can be assigned to a responsible person or organization for control of technical, schedule and cost objectives.
- **INTEGRATING program** *work scope, schedule, and cost objectives* into a performance measurement baseline plan against which accomplishments may be measured (including changes to the baseline).
- **APPLYING ACTUAL COSTS** incurred in performing the work and objectively assessing accomplishments at the work performance level.
- **ANALYZING VARIANCES** from the plan, forecasting impacts, and preparing an estimate at completion (EAC) based on performance to date and work to be performed.

GUIDANCE: Defense Acquisition Guidebook

Provides guidance to support policy in DODI 5000.2

Chapter 11

EVM Contents

- **–11.3. Integrated Program Management**
  - •11.3.1. EVM Defined
    - –11.3.1.1. EVM Applicability
    - **–11.3.1.2. EVM Requirements**

Provides "How to" information

GOOGLE……"DODI 5000.2 Defense Acquisition Guidebook"

GUIDANCE: Defense Acquisition Guidebook

11.3.1.2 Earned Value Management (EVM) Requirements

The program manager should use DFARS clauses **252.242-7005** and **252.242-7006** to place the Earned Value Management System (EVMS) compliance requirement in a solicitation and contract valued **at or greater than $20 million but less than $50 million.**

The program manager should use DFARS clauses **252.242-7001 and 252.242-7002** to place the EVMS **validation** requirement on all solicitations and contracts valued **at or greater than $50 million.**

Note: Until there is a final rule on the new DFARS clauses, the existing clauses (252.242-7001 for solicitations and 252.242-7002 for contracts) should be used.

11.3.1.2. Earned Value Management (EVM) Requirements *Continued……*

For contracts valued at or greater than $20 million but less than $50 million, the following paragraph should be included in the statement of work:

*"In regards to **DFARS 252.242-7001** and **252.242-7002,** the contractor is required to have an Earned Value Management System that complies with ANSI/EIA-748; however, the government will not formally accept the contractor's management system (no compliance review)."* While not required, if a risk-based decision is made to require EVM on cost or incentive contracts valued at less than $20 million or Firm-Fixed Price contracts (*highly discouraged*), the above paragraph should be included in the statement of work.

GUIDANCE: New DOD WBS Handbook

Incorporates revised DOD acquisition policy and guidance

- **–ADDS New WBS definitions** and updates existing ones
- **–CLARIFIES how the WBS should be used**
- **–CHARACTERIZES WBS as an acquisition tool** that integrates program management, systems engineering, contracts, and cost estimating documents
- **–PROVIDES improved usability and web accessibility**

Addresses mandatory procedures for programs subject to **DODI 5000.2**
Providing guidance to industry on extending contract work breakdown structures

Provides common work breakdown structure for the Contract Performance Report (CPR), IMS and Contractor Cost Data Report (CCDR)

Thresholds: DODI 5000.2

Cost/incentive contracts[1] ≥ $50 million[2]

- Compliance with ANSI/EIA-748[3]
- EVM system formally validated and accepted by cognizant contracting officer
- Contract Performance Report (DI-MGMT-81466A)
- Integrated Master Schedule (DI-MGMT-81650)
- Integrated Baseline Reviews

Cost/incentive contracts[1] < $50 million but ≥ $20 million[2]

- Compliance with ANSI/EIA-748[3]
- No formal EVM system validation
- Contract Performance Report (DI-MGMT-81466A) (tailoring recommended)
- Integrated Master Schedule (DI-MGMT-81650) (tailoring recommended)
- Integrated Baseline Reviews

Cost/incentive contracts[1] < $20 million[2]

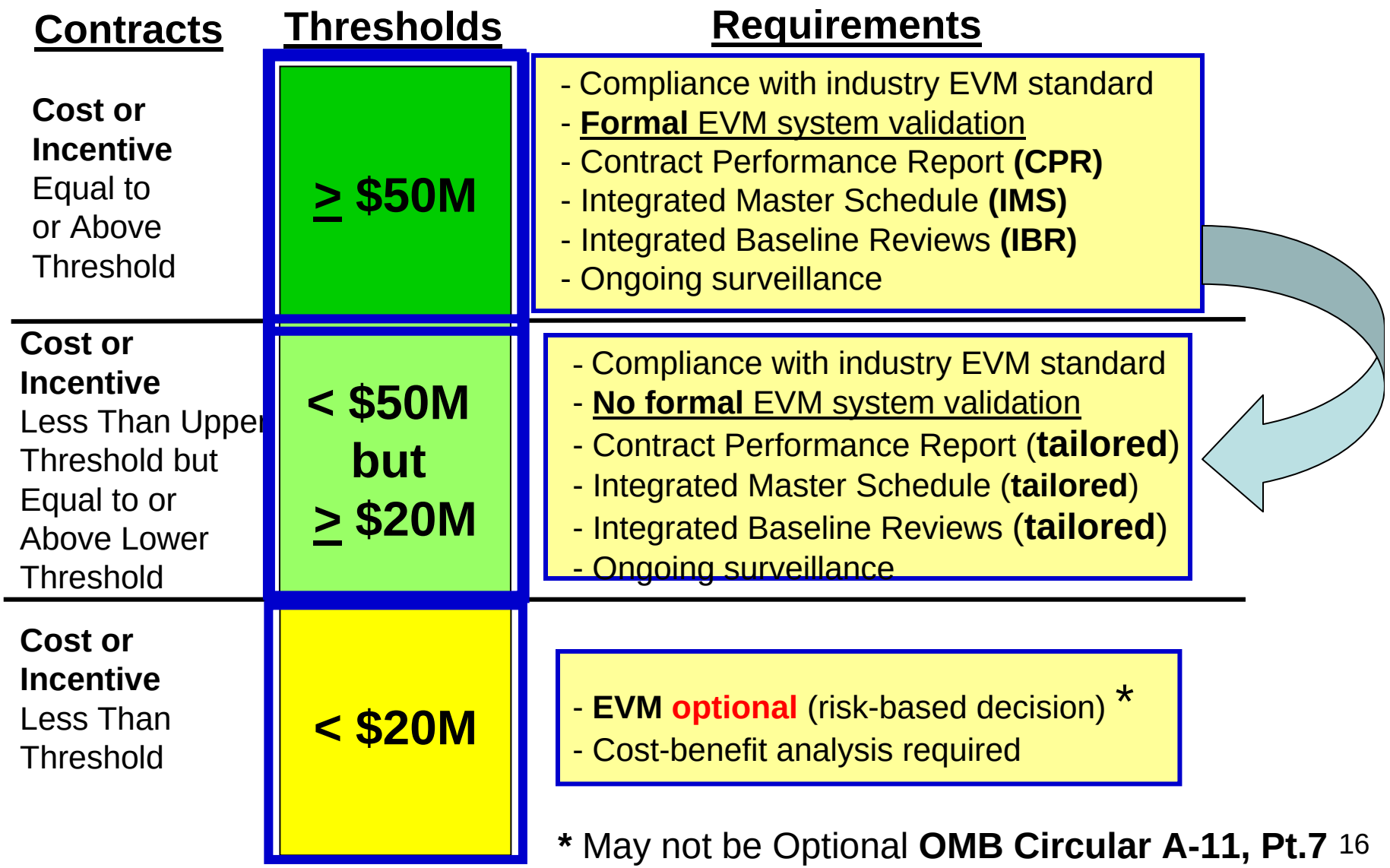
- EVM **optional** based on risk assessment
- Requires cost-benefit analysis
- Requires program manager approval

Firm-fixed price contracts[1] *(highly discouraged)*

- **EVM discouraged regardless of dollar value**
- Requires business case analysis
- Requires milestone decision authority approval

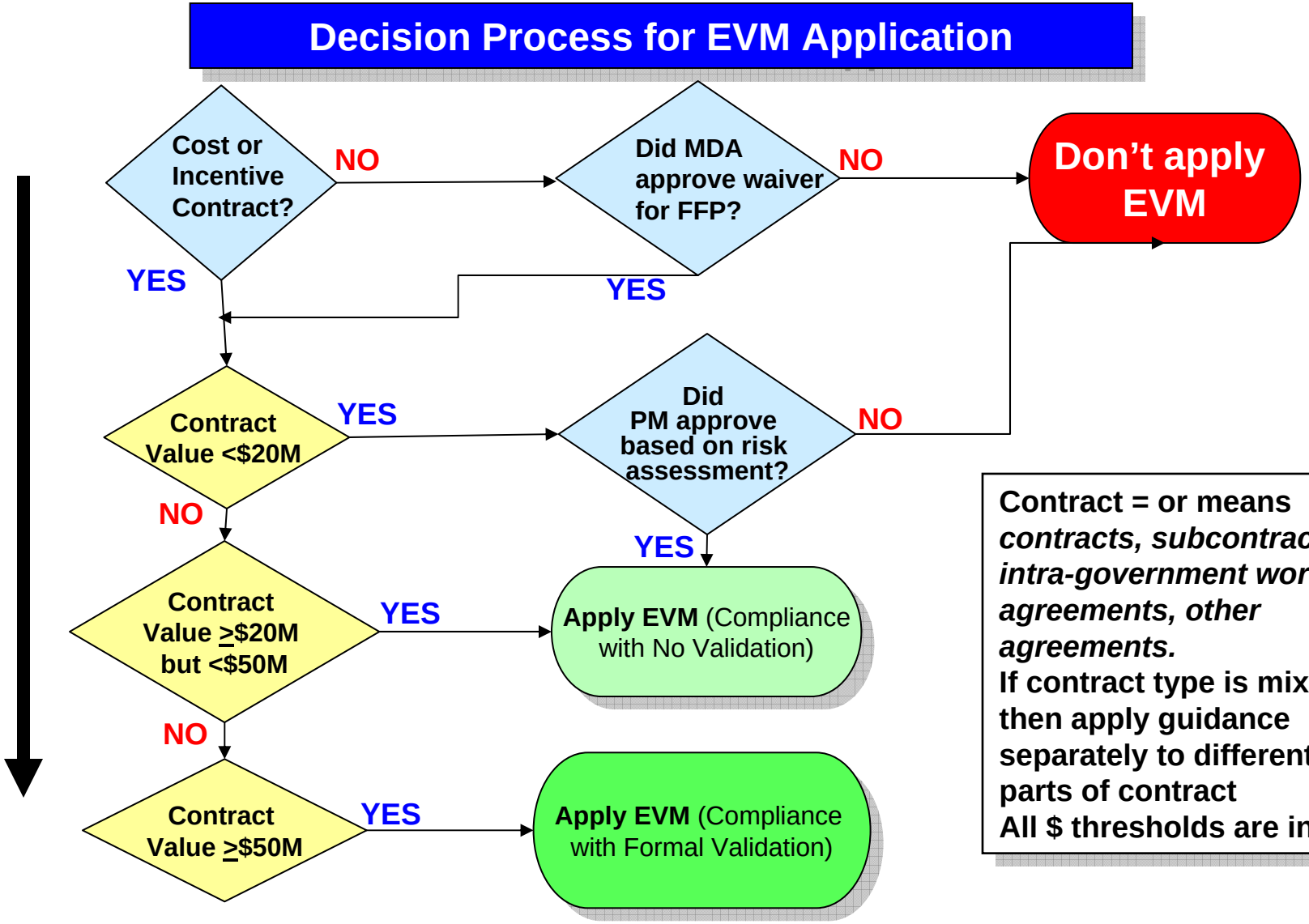
[1]Contracts = contracts, subcontracts, intra-government work agreements, and other agreements.
[2]Application thresholds are in **then-year dollars**.
[3]ANSI/EIA-748 = American National Standards Institute/Electronic Industries Alliance Standard 748, EVMS.

The NEW EVM Thresholds



* May not be Optional **OMB Circular A-11, Pt.7**

Applying the NEW Policy Guidance



Contract = or means *contracts, subcontracts, intra-government work agreements, other agreements.*
If contract type is mixed, then apply guidance separately to different parts of contract
All $ thresholds are in TY$

Contractor Requirements

(1) **Contractor shall use EVMS-ANSI/EIA 748,** to build a proposal, manage contract performance and submit EVMS data to the Government for review and evaluation.

(2) **Demonstrate Compliance or Proof** that the contractor's in-house EVM system does comply with the industry standard;

(3) **Perform periodic system surveillance reviews** to ensure the system continuously meets the industry standard; and

(4) **Perform Integrated Baseline Reviews (IBR)**, a "joint" assessment of the Performance Measurement Baseline (PMB) shortly before or after award (NLT 180 days) to finalize the cost, schedule and performance goals. It is ongoing process throughout the life of the contract to assess changes as they occur. Need IBR whenever Major events or the program changes. Continuous assessment of the PMB will determine when IBR should be performed.

(5) **Provide Contract Performance Report (CPR) when required.**

(6) **Integrated Master Schedule (IMS)** linked to CPR

(7) **Elimination of Cost/Schedule Status Report (C/SSR)** –No Longer

Contract Performance Report (CPR)

The CPR provides contract *cost and schedule performance* data and is used to identify early problems in the contract and helps forecast future contract performance. (Primary means of documenting the ongoing communication between the contractor and program manager (PM))

The PM should obtain a CPR on all cost or incentive contracts, subcontracts, intra-government work agreements, and other agreements valued at or greater than $20 million. The CPR is **not typically required** for cost or incentive contracts valued at less than $20 million, contracts less than 12 months in duration, or Firm-Fixed Price contracts regardless of dollar value.

CPR & IMS reports- placed on contract via Contract Date Requirements List; Requirements in the Data Item Descriptions or (**DID) (**military).

-Contract Performance Report **DI-MGMT-81466A**
-Integrated Master Schedule - **DI-MGMT-81650**

SO WHAT HAS NOT CHANGED?

Limited or No Use of EVM on Firm-Fixed Price (FFP) contracts, it still requires a waiver from the Milestone Decision Authority (MDA).

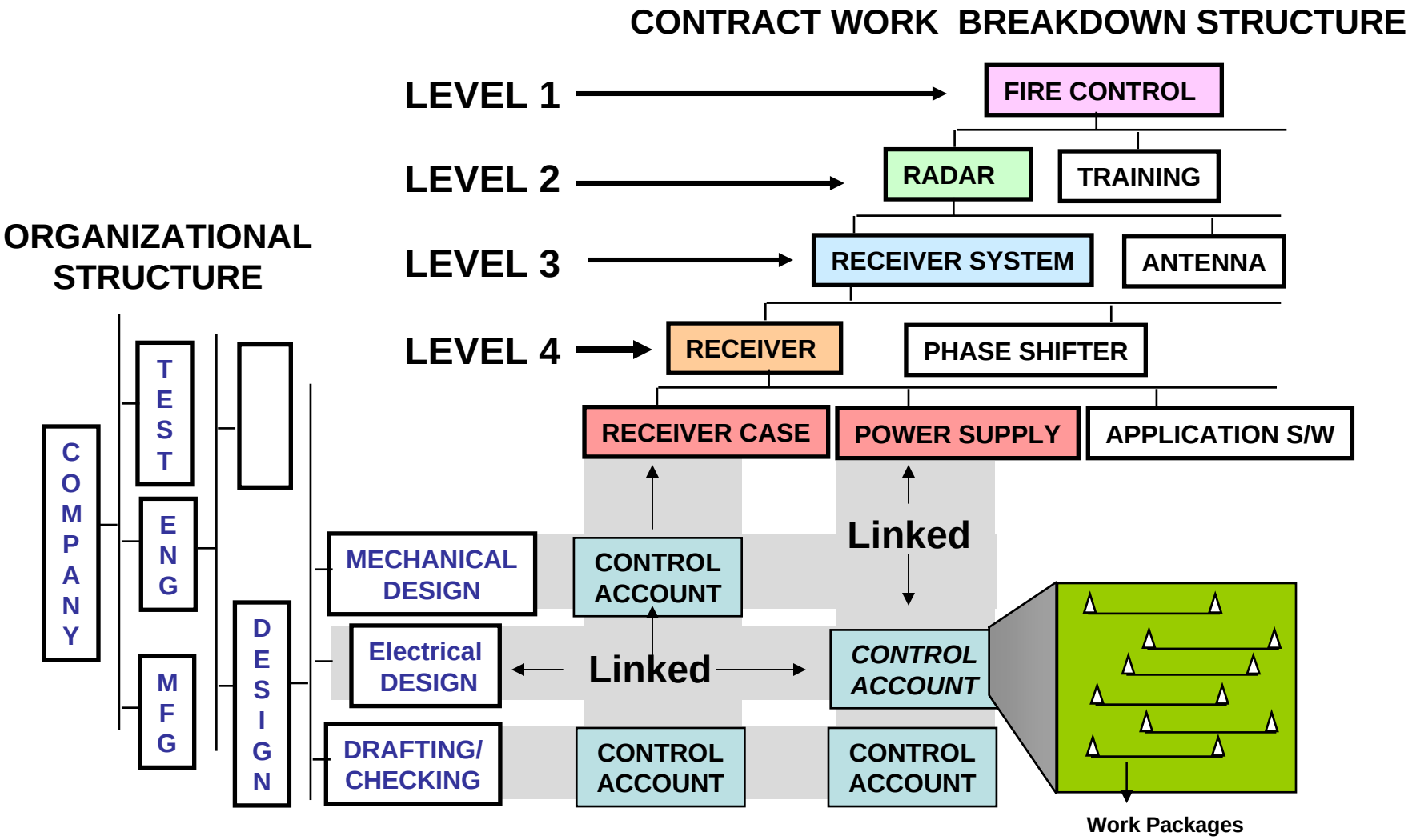
Government surveillance of contracts remains unchanged

- –Based on effectiveness of contractor's implementation of internal management controls and guidance in EVMIG (guidance)

Process of Obtaining EVM system validation & acceptance

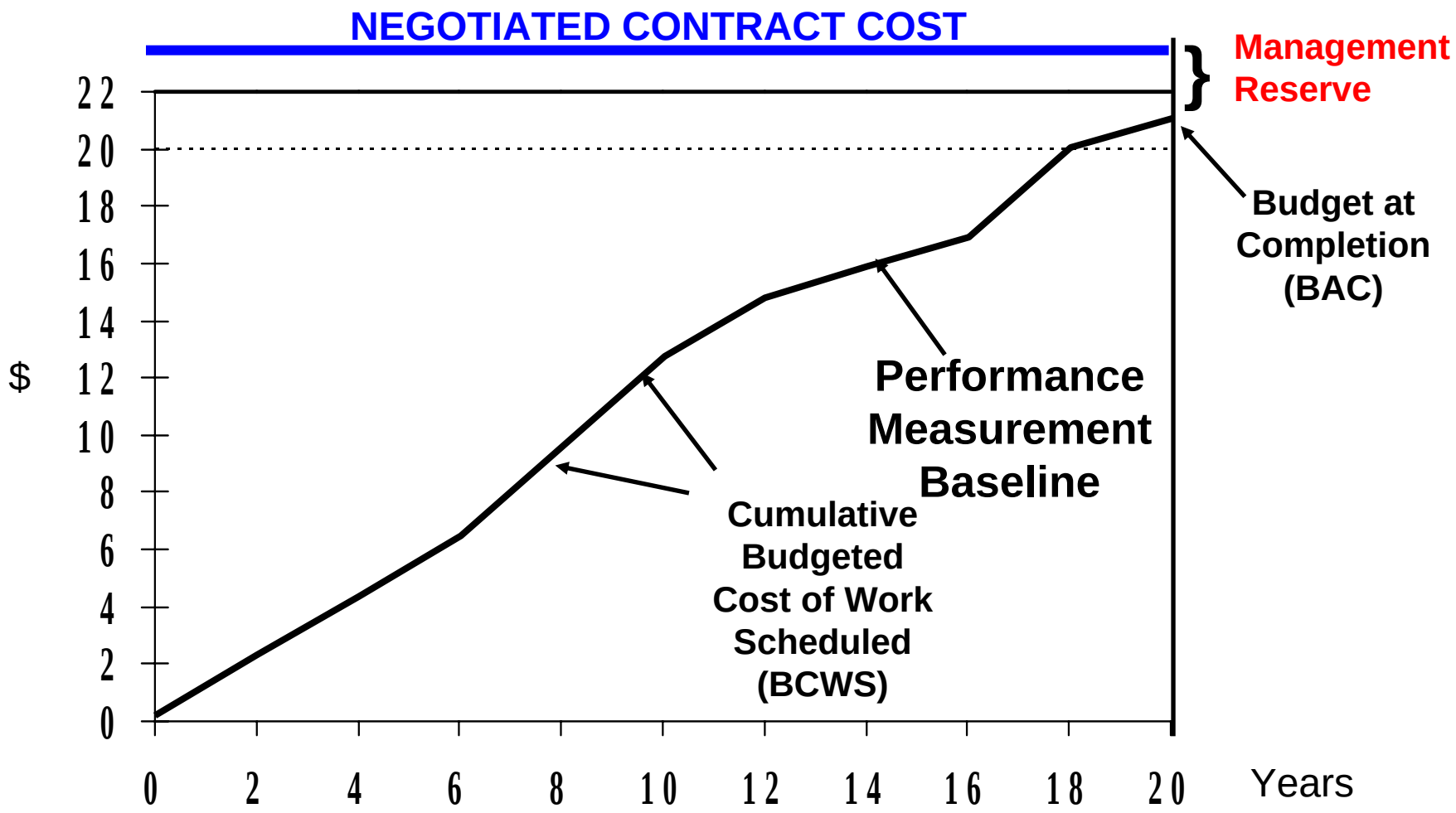
DCMA still the Executive agent for DOD

Responsibility Assignment Matrix
Linking it All Together

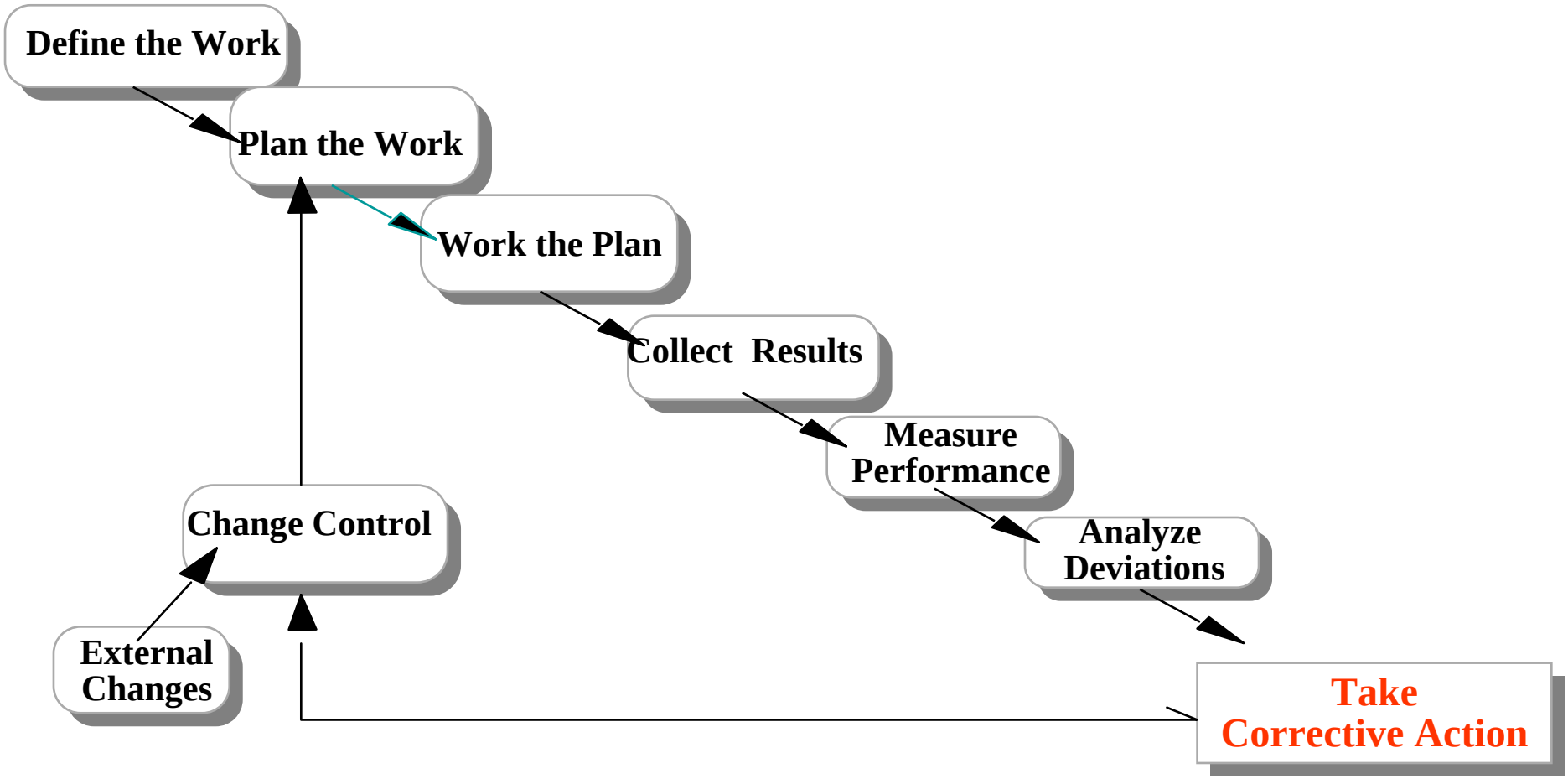


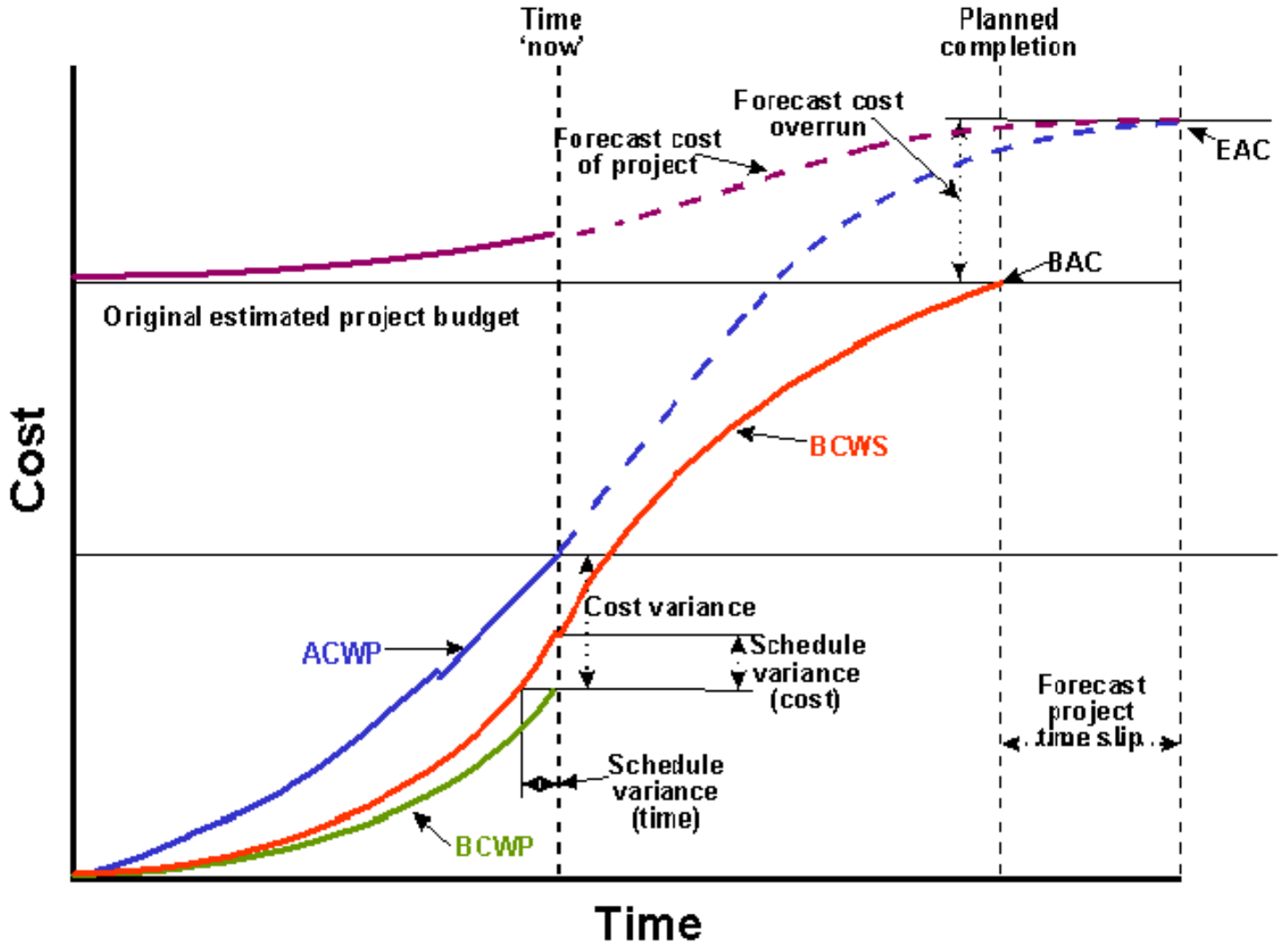
The control account level is determined by the responsibility assignment matrix (RAM). The RAM is defined by combining the contract WBS with the organizational and accounting structure.

Projects Need a Time-Phased Spend Plan



The Earned Value Process





KEY

EAC	Estimate at Completion
BAC	Budget at Completion (current)
BCWS	Budgeted Cost of Work Scheduled (current)
BCWP	Budgeted Cost of Work Performed (earned value)
ACWP	Actual Cost of Work Performed

Tailoring Guidance

- Guidance for tailoring CPR and IMS for cost or incentive contracts **< $50M but ≥ $20M**

- You have considerations when making a risk-based decision to require EVM on cost or incentive contracts **< $20M;** guidance for tailoring reporting requires Program Manager approval.

- If applying EVM on a FFP contract there are strong factors to consider and guidance for tailoring reporting along with *MDA approval required, and this is* ***highly discouraged.***

Tailoring the Contract Performance Report (CPR), You Must Consider:

- Contract work breakdown structure (WBS)
- Frequency and selection of formats
- Level of reporting
- Submission dates
- Date of first and last reports
- Format 5 variance analysis/variance thresholds
- Contractor format
- Electronic data interchange format

Required reports

Contract Performance Report (CPR) formats:

- **Format 1** Work Breakdown Structure **(WBS)**
- **Format 2** Organizational Categories **(OBS)**
- **Format 3** Baseline
- **Format 4** Staffing (Manpower)
- **Format 5** Variance Analysis Report

- **CPR Format 1 (WBS) and Format 5 (Variance Analysis report) are the most widely used reports**

Tailoring the CPR

- **Contracts ≥ $50M FULL EVM**
  - **Mandatory: Formats 1, 2, 3, 4, 5**

    Tailoring options limited *****
- **Contracts ≥ $20M but < $50M**
  - **Mandatory: Formats 1 & 5**
  - Optional: Formats 2, 3, 4

    Flexibility exists for tailoring*

Format 1 should always be a product-oriented WBS

***The same is true for IMS tailoring.**

DFARS Clauses

EVM System Validation Requirement (contracts ≥ $50M)

- Solicitation provision: 252.242-7001
- Contract clause: 252.242-7002

EVM System Compliance Requirement (contracts ≥ $20M but **< $50M)**

- Solicitation provision: 252.242-7005
- Contract clause: 252.242-7006

Civilian Agencies should have an EVM FAR clause soon

Tailoring Contracts < $20M

- **Use of EVM is a risk-based decision**
  - –If program risk is driving need for EVM, you should evaluate all the benefits before deciding how to tailor.
- **Requires**
  - –Prepare a **cost-benefit analysis** (good Mgmt practice)
  - –Obtain Program Manager approval always
- **CPR tailoring options**
  - –**Require Formats 1 and 5 only** (Formats 2, 3, and 4 are not recommended)
    - •Options to consider
      - –Contractor format
      - –Limited variance analysis (Top 10, Top 5, current period only, status meetings, are also viable options).

Tailoring the IMS, consider:

- Degree of networking between suppliers
- Frequency and submission
- Date of first and last reports
- Frequency of schedule risk analysis
- Electronic data interchange format

Tailoring for FFP Contracts

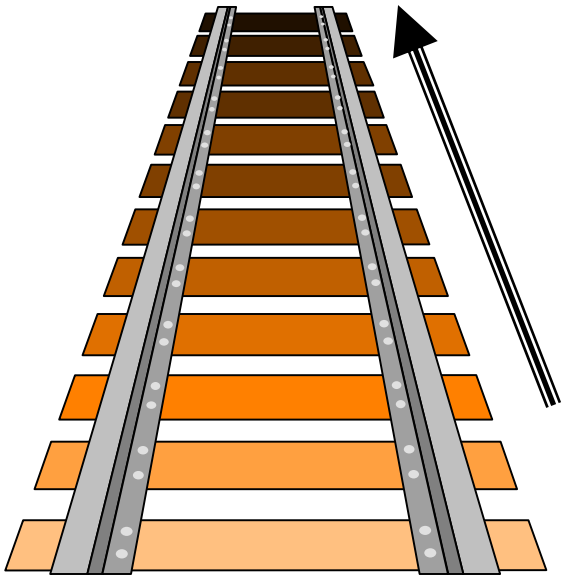
USE OF EVM IS DISCOURAGED

- –If program risk is driving need for EVM, then RE-EVALUATE your contract type to something else….**don't become another Navy A12.**

- **If appropriate**
  - –Prepare a Business Case
  - –Must Obtain Milestone Decision Authority (MDA) approval
- **CPR tailoring options**
  - –**Format 1 or 2:**
    - •Report performance in hours (not dollars)--you already know the $$ FFP
    - •Report costs at price level
      - –Baseline the costs to price factor, ensure uniform application
  - –**Format 3** is optional; **Format 4** is not recommended
  - –**Format 5** options:
    - •If concerned with schedule risk, focus on schedule variances
    - •Eliminate Format 5, and rely on variance analysis provided in the IMS
    - •Alternatives: contractor internal reports, status meetings, status of assembly, or line of balance schedules

EVM measures progress

Progress = movement towards a goal, the Estimate at Completion (**EAC)**



- to measure progress, there must be a **standard** against which the movement may be compared **(The Baseline)**
- EVMS establishes that standard as the “Performance Measurement Baseline” and measures progress against that baseline.

EVMS Measurement & Analysis includes:

Preparing performance reports CPR

Analysis of cost and schedule CSPR

Variance analysis (SV, CV)

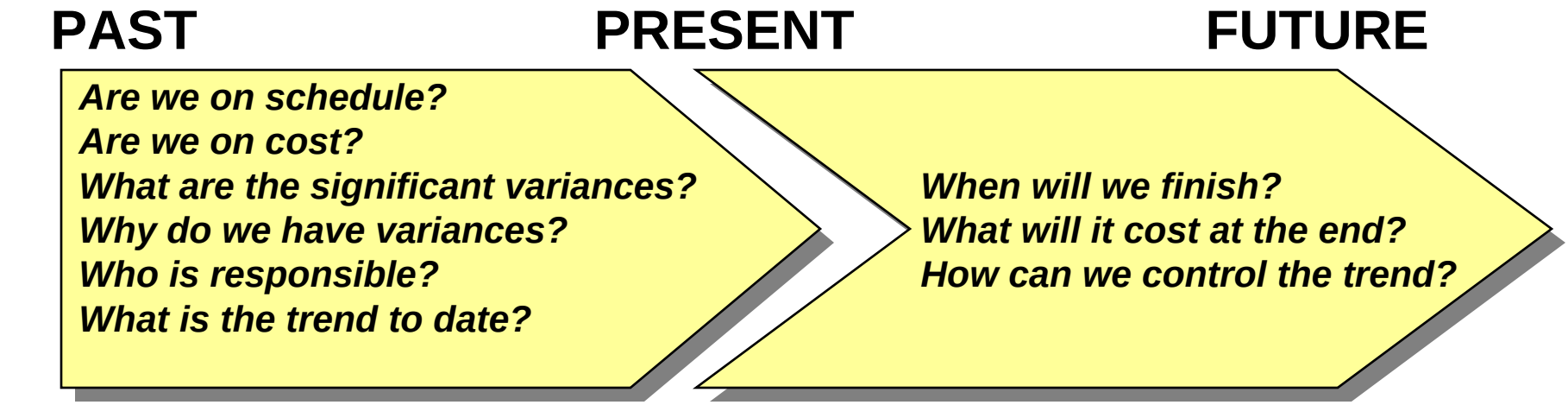
Estimates of Current and Future Costs

Graphical presentations and briefings

Schedule critical path analysis techniques

Key questions that EVM answers

We analyze past performance……*to help us control the future*



The Two Key Questions

1. Did we get what we wanted for what we spent?

2. At the end of the project, is it likely that the cost will be less than or equal to the original estimate?

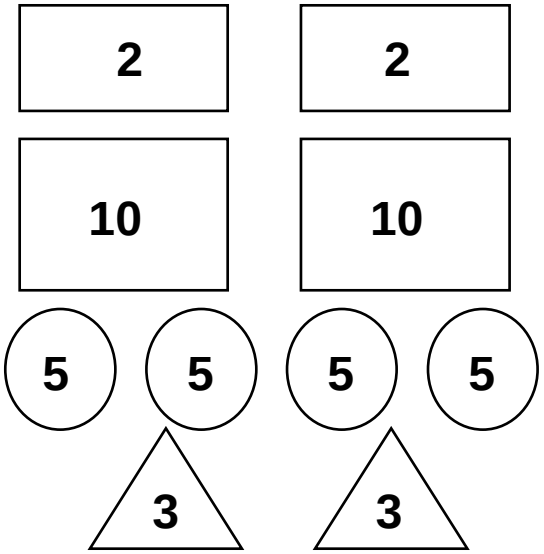
What do we measure progress against?

- **Performance measurement baseline**
  - budget is spread over . . .
  - time, to accomplish the scope of
  - work against which progress can be measured

- **Earned Value is a key concept**
  - how much progress did I make against my original plan?
  - expressed in dollars or hours

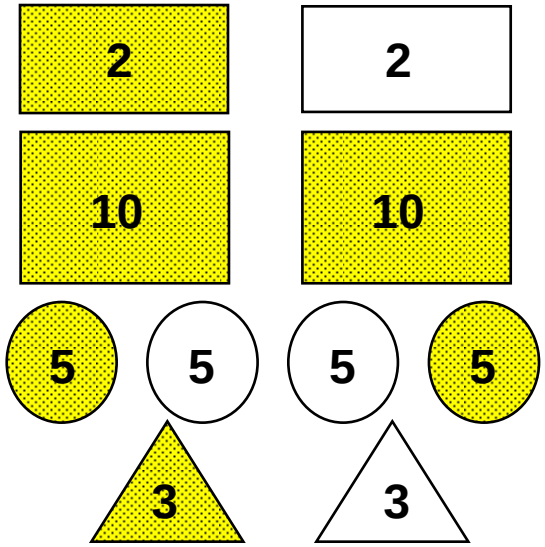
Earned Value Measurement

PLANNED



BUDGET = $50

PERFORMED



EARNED VALUE = $35

ACTUAL COST

= $15

= $25

COST = $40

STATUS: **SV = Earned - Budget = -15 Unfavorable** (Work Not Done)

CV = Earned - Actual = - 5 Unfavorable (more than budget)

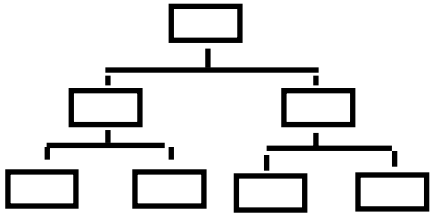
In EVM, we add the additional variable of work performed. The shaded geometric shapes in the PERFORMED section represent the monthly EARNED VALUE of thirty-five dollars. Comparing this with the monthly fifty dollar BUDGET, we now correctly see that fifteen dollars worth of work was not completed. Comparing the EARNED VALUE with the ACTUAL COST we can see the completed work cost five dollars more to complete then was budgeted.

Many management systems measure expenditures but not work

Actual Cost is not an indication of work progress, only an indication of hours/money spent.

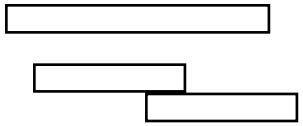
Program Management Baseline Development Steps

Step 1. Define the Work Scope



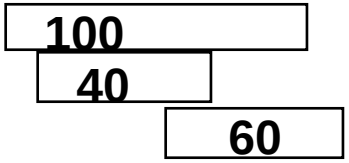
- Identify the scope of work
- Plan the work at the control account / work package level

Step 2. Schedule the Work



- Arrange work packages in order
- Schedule work packages

Step 3. Allocate Budgets to Schedule



- Classify work and select an EVM technique
- Budget work packages
- Spread budget over time
- Calculate cumulative **BCWS**

Reports

First, some Key Components of Earned Value are: PV, EV, AC

- **EVM PERFORMANCE MEASUREMENTS include**:
  - **Cost Variance (CV), Schedule Variance (SV), Schedule Performance Index (SPI), Cost Performance Index (CPI), and they are different.**

- **INTEGRATED BASELINE REVIEW (IBR)** is a re-baseline of a project and proper baseline change control of major events.

- **CONTRACT FUNDS STATUS REPORT (CFSR)**

- **CONTRACTOR COST DATA REPORTING (CCDR)**

Reports: Contract Performance Report (CPR)

All Performance Measurement data reported in the CPR are derived from the formal Earned Value Management System (EVMS).

All reported changes to the project management baseline, management reserve (MR) and contingency should be traceable through the formal Earned Value Management System (EVMS) and CPR reports.

A good ACO will want to see all your data, have it validated before any vouchers or progress payments are made.

The Contract Performance Report

First let's quickly review the projects current status that will be used in the example reports. **Building Project**

Project Start date: January 15th

Status Date: January 31th

EAC calculations used for the example will be based on various assumptions about cost and schedule. See the charts to the right for an overview.

as of 1/31	**PV**	EV	AC	SV	CV	SPI	CPI
Foundation	$15,394	$15,394	$15,850	0	-456	1.00	0.97
Patio	$8,166	$8,166	$7,200	0	966	1.00	1.13
Exterior Walls	$8,748	$6,608	$6,250	-2,140	358	0.76	1.06
Stairway	$5,961	$2,981	$3,100	-2,980	-119	0.50	0.96
Project Total	$38,269	$33,149	$32,400	-5,120	749	0.87	1.02

	ACTUALS	ETC			EAC
Activity	January	February	March	April	Total
1.1.1.1 Pour foundation	$15,850				$15,850
1.1.1.2 Install Patio	$7,200				$7,200
1.1.1.3 Pour stairway	$3,100	$8,942			$12,042
1.1.2.1 Frame exterior walls	$6,250	$9,913			$16,163
1.1.2.2 Frame interior walls		$11,025			$11,025
1.1.2.3 Install roofing trusse		$15,887			$15,887
1.1.3.1 Install waterlines		$6,194			$6,194
1.1.3.2 Install gas lines		$6,255			$6,255
1.1.3.3 Install B/K fixtures		$6,317			$6,317
1.1.4.1 Install wiring		$18,483			$18,483
1.1.4.2 Install outlets/switches			$9,265		$9,265
1.1.4.3 Install fixtures			$13,969	$4,656	$18,625
1.1.5.1 Install drywall			$6,984		$6,984
1.1.5.2 Install Carpeting			$3,100		$3,100
1.1.5.3 Painting			$6,477		$6,477
1.1.6.1 Install felt		$1,834	$611		$2,445
1.1.6.2 Install shingles			$2,445		$2,445
1.1.6.3 Install vents			$812		$812
	$32,400	$84,850	$43,663	$4,656	$165,569

Contract Performance Report Format 1 - WBS

The Contract Performance Report Format 1 includes Current period, cumulative, and at complete values for each WBS element. It also contains header data showing quantity, targets, ceilings, and Management "Estimate At Completion" (EAC) calculations.

Report also contains data about budget, price, Management Reserve (MR),Undistributed Budget (UB), and EAC cases.

CPR Format 1 EXAMPLE of a Building project contains the ***current*** and ***cumulative*** **cost** and schedule information for the project.

Contract Performance Report Format 1 - WBS

COST PERFORMANCE REPORT FORMAT 1 - WORK BREAKDOWN STRUCTURE			Form Approved OMB No. 0704-0188
1. CONTRACTOR a. NAME: ACME Construction b. LOCATION: Denver, CO	2. CONTRACT a. NAME: ACME Housing b. NUMBER: ACME - 1000 c. TYPE: FFP d. SHARE RATIO:	3. PROGRAM a. NAME: ACME Housing b. PHASE (X one) [ ] RDT&E [X] PRODUCTION	4. REPORT PERIOD a. FROM: 01-JAN-02 b. TO: 31-JAN-02

5. CONTRACT DATA

a. QTY	b. NEG COST	c. EST COST AUTH UNPR	d. TGT PROFIT/FEE	e. TGT PRICE	f. EST PRICE	g. CONT CEILING	h. EST CEILING
0	$183,852	$0	$36,147 / 20.00%	219,999	219,999	0	0

6. EST COST AT COMPLETION	MGMT EST AT COMPL (1)	CONT BUDGET BASE (2)	VARIANCE (3)	7. AUTHORIZED CONTRACTOR REPRESENTATIVE	
				a. NAME (Last, First, Middle Initial)	b. TITLE
a. BEST CASE	$227,009			Ted Smith	Manager
b. WORST CASE	$165,467			c. SIGNATURE	d. DATE SIGNED
c. MOST LIKELY	$226,158	$183,852	-$42,306		31-JAN-02

8. PERFORMANCE DATA	CURRENT PERIOD					CUMULATIVE TO DATE					AT COMPLETION		
ITEM	BUDGETED COST		ACTUAL COST	VARIANCE		BUDGETED COST		ACTUAL COST	VARIANCE				
	WORK SCHED	WORK PERF	WORK PERF	SCHED	COST	WORK SCHED	WORK PERF	WORK PERF	SCHED	COST	BUDGET	EST	VAR
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1.1.1 Concrete	9,670	8,757	26,150	-912	-17,393	9,670	8,757	26,150	-912	-17,393	11,485	28,873	-17,388
1.1.2 Framing	7,089	5,355	6,250	-1,734	-895	7,089	5,355	6,250	-1,734	-895	27,147	28,041	-893
1.1.3 Plumbing	0	0	0	0	0	0	0	0	0	0	5,704	5,704	0
1.1.4 Electrial	0	0	0	0	0	0	0	0	0	0	14,070	14,070	0
1.1.5 Interior	0	0	0	0	0	0	0	0	0	0	6,328	7,178	-850
1.1.6 Roofing	0	0	0	0	0	0	0	0	0	0	1,730	1,730	0
OVERHEAD	16,062	14,317	0	-1,745	14,317	16,062	14,317	0	-1,745	14,317	75,684	61,371	14,313
b. COST OF MONEY	19	17	0	-3	17	19	17	0	-3	17	82	65	17
c. GEN & ADMIN	5,429	4,702	0	-726	4,702	5,429	4,702	0	-726	4,702	23,237	18,537	4,700
d. UNDISTRIBUTED BUDGET											0	0	0
e. SUBTOTAL (PM Baseline)	38,269	33,149	32,400	-5,120	749	38,269	33,149	32,400	-5,120	749	165,467	165,569	-102
f. MANAGEMENT RESERVE											18,385		
g. TOTAL	38,269	33,149	32,400	-5,120	749	38,269	33,149	32,400	-5,120	749	183,852		

Contract Performance Report Format 2 –

Organizational Categories

Contract Performance Report (CPR) Format 2 includes current period, cumulative, and at complete values for each Organization (Performing or Responsible), It also contains header data showing quantity, targets, ceilings, and EAC cases. This report also contains data about budget, price, Management Reserve (MR), Undistributed Budget (UB), and EAC cases.

The reporting details in CPR Format 2 are the same as on the CPR Format 1 **except that** it is structured by organization.

CPR Format 2 EXAMPLE Home Building project shows performance data section containing current and cumulative cost and schedule information for the project.

Contract Performance Report Format 2 – Organizational Categories

COST PERFORMANCE REPORT FORMAT 2 - ORGANIZATIONAL CATEGORIES			Form Approved OMB No. 0704-0188
1. CONTRACTOR a. NAME: ACME Construction b. LOCATION: Denver, CO	2. CONTRACT a. NAME: ACME Housing b. NUMBER: ACME - 1000 c. TYPE: FFP d. SHARE RATIO:	3. PROGRAM a. NAME: ACME Housing b. PHASE (X one) [ ] RDT&E [X] PRODUCTION	4. REPORT PERIOD a. FROM: 01-JAN-02 b. TO: 31-JAN-02

5. PERFORMANCE DATA	CURRENT PERIOD					CUMULATIVE TO DATE					AT COMPLETION		
ITEM	BUDGETED COST		ACTUAL COST	VARIANCE		BUDGETED COST		ACTUAL COST	VARIANCE				
	WORK SCHED	WORK PERF	WORK PERF	SCHED	COST	WORK SCHED	WORK PERF	WORK PERF	SCHED	COST	BUDGET	EST	VAR
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
Construction													
Construction	12,116	9,560	10,300	-2,556	-740	12,116	9,560	10,300	-2,556	-740	17,226	17,965	-739
Management													
Project Management	7,503	5,668	6,250	-1,835	-582	7,503	5,668	6,250	-1,835	-582	19,475	20,057	-582
SubCont													
Subcontractor Mgmt	13,203	13,203	15,850	0	-2,647	13,203	13,203	15,850	0	-2,647	36,272	38,919	-2,647
SUBTOTAL	32,821	28,430	32,400	-4,391	-3,970	32,821	28,430	32,400	-4,391	-3,970	72,973	76,941	-3,969
b. COST OF MONEY	19	17	0	-3	17	19	17	0	-3	17	82	65	17
c. GEN & ADMIN	5,429	4,702	0	-726	4,702	5,429	4,702	0	-726	4,702	23,237	18,537	4,700
d. UNDISTRIBUTED BUDGET											0	0	0
e. SUBTOTAL (PM Baseline)	38,269	33,149	32,400	-5,120	749	38,269	33,149	32,400	-5,120	749	165,467	165,569	-102
f. MANAGEMENT RESERVE											18385		
g. TOTAL	38,269	33,149	32,400	-5,120	749	38,269	33,149	32,400	-5,120	749	183,852		
6. RECONCILIATION TO CONTRACT BUDGET BASE													
a. VARIANCE ADJUSTMENT									0	0			
b. TOTAL CONTR VARIANCE									0	0	0	0	0

Contract Performance Report Format 3 – Baseline

Contract Performance Report (CPR) Format 3 displays a **forecast of monthly changes to the Baseline**, **Management Reserve, and Undistributed Budget** for the entire project, and contains header data showing schedule dates for the contract and the project.

COST PERFORMANCE REPORT FORMAT 3 - BASELINE			DOLLARS IN THOUSANDS	Form Approved OMB No. 0704-0188
1. CONTRACTOR a. NAME: ACME Construction b. LOCATION: Denver, CO	2. CONTRACT a. NAME: ACME Housing b. NUMBER: ACME - 1000 c. TYPE: FFP d. SHARE RATIO:	3. PROGRAM a. NAME: ACME Housing b. PHASE (X one) [ ] RDT&E [X] PRODUCTION		4. REPORT PERIOD a. FROM: 01-JAN-02 b. TO: 31-JAN-02

5. CONTRACT DATA

a. ORIGINAL NEGOTIATED COST	b. NEGOTIATED CONTRACT CHANGE	c. CURRENT NEGOTIATED COST (A + B)	d. ESTIMATED COST AUTH UNPRICED WORK	e. CONTRACT BUDGET BASE (C + D)	f. TOTAL ALLOCATED BUDGET	g. DIFFERENCE (E - F)
$0	$0	$0	$0	$0	$0	$0

h. CONTRACT START DATE	i. DEFINITIZATION DATE	j. PLANNED COMPL DATE	k. CONT COMPLETION DATE	l. EST COMPLETION DATE
01-JAN-01			31-DEC-01	

6. PERFORMANCE DATA

ITEM	BCWS CUM TO DATE	BCWS FOR REPORT PERIOD	BUDGETED COST FOR WORK SCHEDULED (NON - CUMULATIVE) SIX MONTH FORECAST +1	+2	+3	+4	+5	6+	AUG02	SEP02	OCT02	NOV02	DEC02	UNDISTRIB BUDGET	TOTAL BUDGET
	(2)	(3)	FEB02 (4)	MAR02 (5)	APR02 (6)	MAY02 (7)	JUN02 (8)	JUL02 (9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1)															
a. PM BASELINE (BEGIN OF PERIOD)	165	0	0	0	0	0	0	0	0	0	0	0	0	0	165
b. BASELINE CHANGES AUTH DURING REPORT PERIOD															
c. PM BASELINE (END OF PERIOD)	38		73	49	5	0	0	0	0	0	0	0	0	0	165
7. MANAGEMENT RESERVE															18
8. TOTAL															184

Cost Performance Report (CPR) Format 4 – Staffing

The Cost Performance Report (CPR) Format 4 displays a forecast of hours and person-months by Organization (Performing/Responsible), and contains header data showing schedule dates for the contract and the project. This report also contains program variance thresholds for month, cumulative, and at-complete percents & values.

COST PERFORMANCE REPORT FORMAT 4 - STAFFING												Form Approved OMB No. 0704-0188	
1. CONTRACTOR a. NAME: ACME Construction b. LOCATION: Denver, CO			2. CONTRACT a. NAME: ACME Housing b. NUMBER: ACME - 1000 c. TYPE: FFP d. SHARE RATIO:					3. PROGRAM a. NAME: ACME Housing b. PHASE (X one) [ ] RDT&E [X] PRODUCTION				4. REPORT PERIOD a. FROM: 01-JAN-02 b. TO: 31-JAN-02	
5. PERFORMANCE DATA			FORECAST (NON - CUMULATIVE)										
ORGANIZATIONAL CATEGORY	ACTUAL CURRENT PERIOD	ACTUAL END OF CURRENT PERIOD (CUM)	SIX MONTH FORECAST BY MONTH						AUG02	SEP02	OCT02	NOV02	DEC02	AT COMPL
			+1 FEB02	+2 MAR02	+3 APR02	+4 MAY02	+5 JUN02	+6 JUL02						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Construction														
Hours	0	0	121	0	0	0	0	0	0	0	0	0	0	343
Man Months	0	0	1	0	0	0	0	0	0	0	0	0	0	2
Project Management														
Hours	0	0	134	0	0	0	0	0	0	0	0	0	0	134
Man Months	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Subcontractor Mgmt														
Hours	0	0	138	0	0	0	0	0	0	0	0	0	0	305
Man Months	0	0	1	0	0	0	0	0	0	0	0	0	0	2
6. TOTAL DIRECT														
Hours	0	0	393	0	0	0	0	0	0	0	0	0	0	781
Man Months	0	0	2	0	0	0	0	0	0	0	0	0	0	5

Cost Performance Report (CPR) Format 5 – Variance Analyses Report

The Contract Performance Report (CPR) Format 5 provides **narrative explanation of cost, schedule, and other problems** related to total contract, undistributed budget (UB), management reserve (MR), PMB, and manpower.

The variance reporting thresholds are pre-determined prior to the start of the program. Explanations and problem analysis reporting is only required for those variances that breech the pre-set threshold(s). The report will indicate those variances needing explanation.

A copy of the Variance Analyses Report is on the following page. The variance report uses the EXAMPLE of the same project information.

Contract Performance Report Format 5 – Variance Analyses Report

WBS: 1.1 Manager: Phillips
Desc: House Building Project Charge #:
(EAC - Actuals thru JAN-02 + ETC)

TOTAL $$	BCWS	BCWP	ACWP	SCHED-VAR		%	COST-VAR		%
Mon Hours	389	328	0	-61		-16	328		100
Cum Hours	389	328	0	-61		-16	328		100
Mon Dollars	38,269	33,149	32,400	-5,120	*	-13	749	*	2
Cum Dollars	38,269	33,149	32,400	-5,120	*	-13	749	*	2
BAC Hours	1,732	EAC:	1,404			VAC:	328		19
BAC Dollars	165,467	EAC:	165,569			VAC:	-103	*	0

PROBLEM ANALYSIS: (* = requires explanation)

The schedule variance is due to delays in completing the framing of the exterior walls. This delay is caused by both material shortages and availability of qualified resources.

The cost variance is due to increased productivity in installing the patio. The concrete subcontractor developed a faster way of forming a pour the stairway.

TASK/PROJECT IMPACT:

Framing the exterior walls will be completed on schedule and no delay will occur to the project complete.

CORRECTIVE ACTION PLAN:

The current skill mix will be adjusted to complete this activity as scheduled. The ACME project management team is conducting a review of all future work to determine if resource availability will an issue.

Preparer:	Dept:	Initials:	Date:
Approval:	Dept:	Initials:	Date:

Header information includes quantified cost and schedule variances and indicates out of tolerance items. Explanations may be required for monthly, cumulative, and at complete variances.

Problem Analysis:

This section is used to explain the variance drivers, abnormal conditions and factors creating variances, and other issues, problems, and concerns.

Task/Project Impact:

This section is used to explain the impact to the Control Account and overall Project.

Corrective Action Plan:

This section provides the recovery and risk mitigation plan.

Cost/Schedule Summary Report (C/SSR)??

Cost/Schedule Summary Report (C/SSR) is the final standard EVMS report and it is used primarily **for reporting cost and schedule summary data to the government or contractors** on specific Government contracts (Simulation System, F-22 Raptor, etc)

This report includes cumulative and at complete summaries for each WBS element, and contains header data showing contractor and contract information, and EAC calculations and data about contract price, budget, Management Reserve (MR), Undistributed Budget (UB), and EAC cases.

It is very similar to the CPR Format 1 **except** that the C/SSR **has only Cumulative information.**

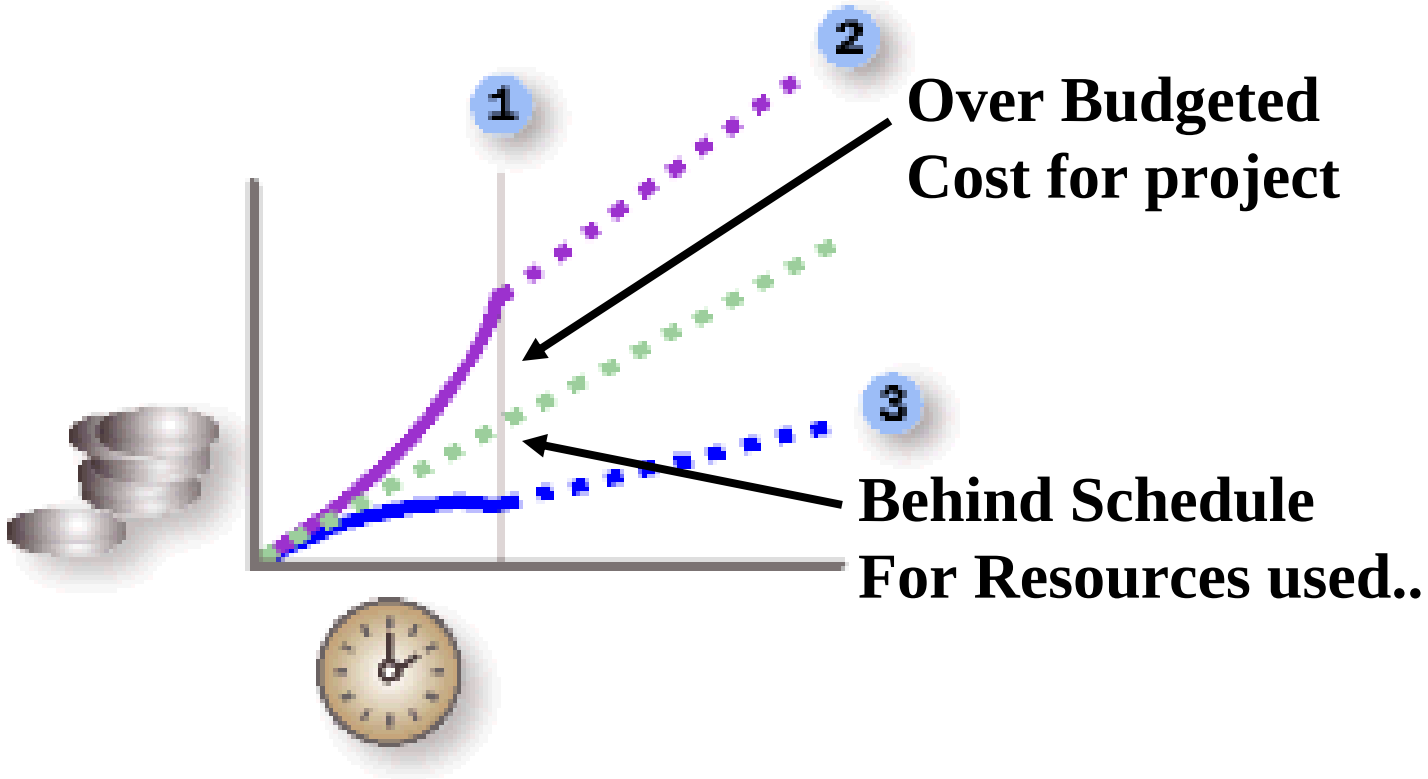
C/SSR for the Example is on the following page.

Cost/Schedule Summary Report (C/SSR)

COST/SCHEDULE STATUS REPORT			Form Approved OMB No. 0704-0188
1. CONTRACTOR a. NAME: ACME Construction b. LOCATION: Denver, CO	2. CONTRACT a. NAME: ACME Housing b. NUMBER: ACME - 1000 c. TYPE: FFP d. SHARE RATIO:	3. PROGRAM a. NAME: ACME Housing b. PHASE (X one) [ ] RDT&E [X] PRODUCTION	4. REPORT PERIOD a. FROM: 01-JAN-02 b. TO: 31-JAN-02
5. AUTHORIZED CONTRACTOR REPRESENTATIVE a. NAME (Last, First, Middle Initial) Ted Smith	b. TITLE Manager	c. SIGNATURE	d. DATE SIGNED 31-JAN-02
6. CONTRACT DATA			
a. ORIGINAL CONTRACT TARGET COST $0	b. NEGOTIATED CONTRACT CHANGES $0	c. CURRENT TARGET COST (A + B) $0	d. EST COST OF AUTH UNPR WORK $0
e. CONTRACT BUDGET BASE (C + D) $0	f. MGMT ESTIMATE AT COMPLETION $0	g. VARIANCE AT COMPLETE (E - F) $0	h. OVER TARGET BASELINE DATE 01-JAN-02

7. PERFORMANCE DATA	CUMULATIVE TO DATE					AT COMPLETION		
ITEM	BUDGETED COST		ACTUAL COST	VARIANCE				
	WORK SCHEDULED	WORK PERFORMED	WORK PERFORMED	SCHEDULED	COST	BUDGET	ESTIMATE	VARIANCE
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1.1.1 Concrete	9,670	8,757	26,150	-912	-17,393	11,485	28,873	-17,388
1.1.2 Framing	7,089	5,355	6,250	-1,734	-895	27,147	28,041	-893
1.1.3 Plumbing	0	0	0	0	0	5,704	5,704	0
1.1.4 Electrical	0	0	0	0	0	14,070	14,070	0
1.1.5 Interior	0	0	0	0	0	6,328	7,178	-850
1.1.6 Roofing	0	0	0	0	0	1,730	1,730	0
OVERHEAD	16,062	14,317	0	-1,745	14,317	75,684	61,371	14,313
b. COST OF MONEY	19	17	0	-3	17	82	65	17
c. GEN & ADMIN	5,429	4,702	0	-726	4,702	23,237	18,537	4,700
d. UNDISTRIBUTED BUDGET						0	0	0
e. SUBTOTAL (PM Baseline)	38,269	33,149	32,400	-5,120	749	165,467	165,569	-102
f. MANAGEMENT RESERVE						18,385		
g. TOTAL	38,269	33,149	32,400	-5,120	749	183,852		

THIS DEPICTS VARIANCES BETWEEN PLANNED & ACTUAL
AND THE WORK ACTUALLY PERFORMED ON THE CONTRACT



#1 The **status date** determines the values Project calculates.
#2 The actual cost **(ACWP)** of this project has exceeded the budgeted cost.
#3 The earned value **(BCWP)** reflects the true value of the work performed.

Value of work performed **is less than** the amount spent to perform the work

EARNED VALUE FORMULAS

BAC Budget at Completion

ACWP Actual Cost of Work Performed

BCWP Budgeted Cost of Work Performed **(Earned Value)**

BCWS Budgeted Cost of Work Scheduled (% complete)

EAC Estimate Actual Costs

TCPI To-Complete Performance Index
Example: **TCPI = (BAC - BCWP) / (BAC - ACWP)**

EARNED VALUE FORMULAS

CV **Cost Variance** shows the difference between "should have cost and "actually cost" to achieve the current level of completion up to the status date

SV **Schedule Variance** shows the difference in cost terms between "current progress" and baseline plan of a task or a project up to the status date.

VAC **Variance-at-Completion** shows the difference between the BAC (Budgeted At Completion) or baseline costs and EAC (Estimated At Completion) for the task or project.

32 EVMS CRITERIA FOR CERTIFICATION

Organization

•Define contract work using work breakdown structure
•Identify organizational responsibilities to include subs
•Integrate planning, scheduling, budgeting, work authorization and cost accumulation
•Identify overhead control responsibilities
•Measure performance by WBS and organizational breakdown

Planning and Budgeting

•Schedule work showing task inter-dependencies
•Identify physical products, milestones, tech performance progress metrics
•Establish and maintain a performance measurement baseline
•Establish budgets for work
•Establish work packages and planning packages
•Identify and control LOE
•Identify overhead budgets
•Identify Management Reserves (MR) and undistributed budgets
•Reconcile project cost goal with internal budgets and MR

Accounting

•Record direct costs consistent with work budgets
•Summarize direct costs without allocation to two or more WBS
•Summarize direct costs without allocation to two or more organization elements
•Record all indirect costs
•Identify unit/equivalent unit or lot costs, when needed
•Provide full accountability, performance measurement, and accurate cost accumulation

Analysis and Management Reports

•At least monthly, provide management with information on planned/accomplished work and costs
•At least monthly, identify direct cost/schedule variances
•Identify indirect cost variances as needed
•Summarize variances by WBS and/or organizational element
•Implement actions based upon EV information
•Develop estimates of costs at completion

Revisions and Data Maintenance

•Incorporate changes timely
•Control internal re-planning
•Control retroactive changes
•Change budget only when authorized
•Document changes to performance baseline

Validating an EVM System (DoD):

- **Identify a product focused effort**
  - Greater than $6M **(Non-DOD) must decide on limits**
  - One year or longer in duration
- **Identify current management control tools**
  - Planning
  - Budgeting
  - Work authorization
  - Scheduling
  - Cost Accumulation
  - Performance measurement
  - Change control (remember—to re-baseline is not good).
- **Compare tools with 32 EVM performance standards**
- **Test system on the project**

Use A Validated EVM System

- Identify a product focused project
- Obtain system description
- Develop program unique procedures
- Train personnel
- Test system

Maintain An EVM System

- **Establish memorandum of agreement between PMA and team site (and contractor)**
- **Establish surveillance plan for site system**
- **Collect and analyze all performance metrics including cost and schedule.**
- **Modify system as appropriate to meet changing requirements**

Definitions and Formulas:

Budgeted Cost of Work Scheduled (**BCWS**) is now referred to as.....**Planned Value (PV)**

Actual Cost of Work Performed (**ACWP**) is referred to ..... **Actual Cost (AC)**

Budgeted Cost of Work Performed (**BCWP**) is now..... **Earned Value (EV)**

Budget at Completion (**BAC**) **is still**..... **Budget at Completion BAC**

Estimate at Completion (**EAC**) **is still**..... **Estimate at Completion EAC**

Estimate to Completion (**ETC**) **is still**..... **Estimate to Completion ETC**

Percentage Complete (**PC**) **is still**.....**Percentage Complete PC**

EV = PV x PC ..... or..... BCWP = BCWS x PC

SV = EV – PV ..... or..... SV = BCWP – BCWS

SV% = SV / PV x 100 ..... or..... SV% = SV / BCWS x 100

SPI = EV / PV ..... or..... SPI = BCWP / BCWS

CV = EV – AC..... or.....CV = BCWP – ACWP

CV% = CV / EV x 100 ..... or.....CV% = CV / BCWP x 100

CPI = EV / AC..... or.....CPI = BCWP / ACWP

EAC = AC / EV x BAC ..... or..... EAC = ACWP / BCWP x BAC

ETC = EAC – AC ..... or..... ETC = EAC – ACWP

Budget Variance = EAC – BAC ..... or..... Budget Variance = EAC – BAC

Some Tools of the Trade

- There are software tools for tracking EVMS--with names such as *Winsight* (used by DCMA), *Welcom Cobra*, and *Dekker Trakker*. **Primavera** has a powerful EVMS component and Microsoft has been busy adding *EVM functions to MS Project*.
- EVMS is primarily a business process and project management method, not a "software thing."

Closing Thoughts

- Contract Performance Measurement will reply upon EVM where “it makes sense” to use it. Do not think it’s applicable in every situation.
- OSD continues to make EVM a priority and plans to stay actively engaged and so to is OMB.
- EVM working groups will continue to work issues, share improvement ideas, and recommend and implement solutions.
- The Goal is to ensure performance management and program management processes are fully integrated, effective, consistent, and reflective of industry best practice, and that the Govt. gets what it pays for on schedule, on target, and with quality delivery.

Closing Thoughts

- EVM can drive people into planning and tracking too much detail. The more detailed you get in your plan and reporting against that plan, the more time-consuming and cumbersome it gets…and time gets translated into $$, of course.
- **Government work will cost more**

Closing Thoughts

- In project work, there is generally a high degree of variability in task times and work that will have to be done or can't be done due to discoveries. The greater the detail, the more apt your schedule will have to be modified AND the longer it will take to make those modifications (it can be very tedious work).

- Schedulers end up spending more time making modifications than analyzing the schedule for ***priorities and risks***. The schedule frequently is used as a historical record of what happened, rather than a forward-looking tool.

Closing Thoughts

- **NEGATIVE.** Reports are generally geared to *looking in the rear-view mirror*—what has happened, why, how much it cost.
- Meanwhile, the project manager and the project team need information as quickly as possible to move forward. I've seen PM's spend 1-2 days per week tracking issues that happened in the past. That's valuable time he/she could have spent **looking forward and managing** the project team.

Closing Thoughts

- A major issue that starts at the beginning—is the construction of the schedule itself.

- Schedules are constructed typically with $$ in mind, rather than focusing on the work. That translates into a lot of number-fudging down the line.

Closing Thoughts

- Remember to include EVM clauses in your RFP or clauses that require the maximum use of cost/schedule data and reduces the burden on contractors where possible.
- When tailoring, minimize requirements by contractors
- Require all cost/schedule data (reports) to be reported using EDI standards where possible.
- State that validated performance measurement data is a required factor in any Award Fee provision.

Closing Thoughts

- Sometimes it ends up being more important to capture the $$ to equal the contract value than anything else.

- Task times and resources allocated to tasks end up being adjusted not because it realistically reflects the work they'll do, but to match $ numbers quoted (even if the quote was given on a somewhat obfuscated requirement).

- You can end up with a schedule that has no credible critical path, and no valid information that gives the project manager good information (forward decision-making).
- With EVM being at the forefront of everyone's thinking, wrong decisions can easily be made by doing tasks that will give the EV report good numbers, rather drive the project.

Closing Thoughts

- If the work is the focus of project efforts, costs will be reduced and the probability of on-time completion is far greater.

- Costs are important, but should not be the only or even the primary consideration.

- Schedules need to be constructed with 3 major things in mind:

1) Clear, stable set of priorities
2) Downstream visibility
3) Credible or realistic.

Closing Thoughts

- **Everyone allows for variability in schedules**, usually by inflating all task times to one degree or another, and adding as much management reserve as one can get away with.

- ***Critical Chain*** is the only methodology that aggregates variability into buffers that are explicitly managed.

- **Slack management** isn't always explicit, and not done in a formal way that all parties understand.

- **EVM, in and of itself, may not always be the best solution**. Possibly with *Critical Chain* there is a way to incorporate the $ costs in such a way that it would be easier to track and still keeps everyone focused on being forward looking.

Questions?

FOR MORE INFO CONTACT ME VIA:
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Special thanks to Mr. Mike Kasiak for his insights and thoughts.